Te Kōrero o te whakahaere i ngā kāhui wai māori o Te Kaituna

The Kaituna Freshwater Management Unit Story

The purpose of this booklet is to explain draft options to address requirements of the National Policy Statement for Freshwater Management 2020 (NPSFM) in the Draft Kaituna Freshwater Management Unit (FMU). These options are to do with how we manage freshwater in Kaituna to achieve outcomes the community wants there.

This booklet covers:

- A description of the draft FMU
- Freshwater management issues in this FMU
- Options for:
  - **A.** A long-term vision for freshwater;
  - **B.** Proposed outcomes for key freshwater values;
  - **C.** Water quality, ecosystem health and other issues and targets;
  - **D.** Water take limits and minimum flows; and
  - **E.** The kinds of rules and other methods being considered to achieve these things.

We are early in the policy development process and are seeking feedback from the community to help inform the important decisions.

Your feedback to the questions inside this booklet can be provided in writing on the corresponding question sheet, online via our website or in person at one of our community events.

TOI MOANA
BAY OF PLENTY
REGIONAL COUNCIL

Ko te wai te oranga o ngā mea katoa

Water is the life-giver and essence of all things

Ngā tohu

This design represents the multiple waterways and waterbodies such as streams, rivers, lakes, and sea. The overall flowing form represents a river/tributary carving its way through the whenua. The koru has been included to represent the life force that water embodies and gives. Haehae represent whakapapa, including the past, present and future. It is a visual celebration of water as a life-giver and the essence of all things.

Te Wairere represents a waterfall with huka (foam) the dynamic movement of the water and the connections between different tributaries as they flow from the land to the sea, mai i te whenua, ki te moana.

Te Mana o te Wai - Tirohanga whānui

Essential Freshwater - Overview

In 2020, the New Zealand Government released the National Policy Statement for Freshwater Management (NPSFM) which outlines the direction all regional councils must take in the management of freshwater. As a result, the Bay of Plenty Regional Council now needs to change its Regional Policy Statement (RPS) and Regional Natural Resources Plan (Regional Plan). This means changing some of the policies and rules we use to manage how freshwater and land is used.

Between April 2023 and September 2023 we will ask you about your aspirations for your local waterways and your feedback on our draft change options. Your elected regional councillors will then consider and decide on options.

By the end of 2024 we will notify formal proposed changes to policies and rules. Everybody will be able to make submissions and be heard by a freshwater hearings panel.

Draft change options *2022 - 2023*	**Community engagement** *April - Sept 2023*	**Amend options** *Late 2023*	**Councillors decide** *Late 2024*	**Notify propsed RPS and RNRP change** *Late 2024*	**Public submissions** *2025*	**Hearings** *Late 2025 - 2026*

We acknowledge there are already a lot of other changes happening due to a host of new national regulations and proposed new laws, and this is yet more. Nevertheless, we encourage your involvement because many of the proposals discussed are specific to this FMU and we need you, the community, to help work through and identify solutions that will work for us all.

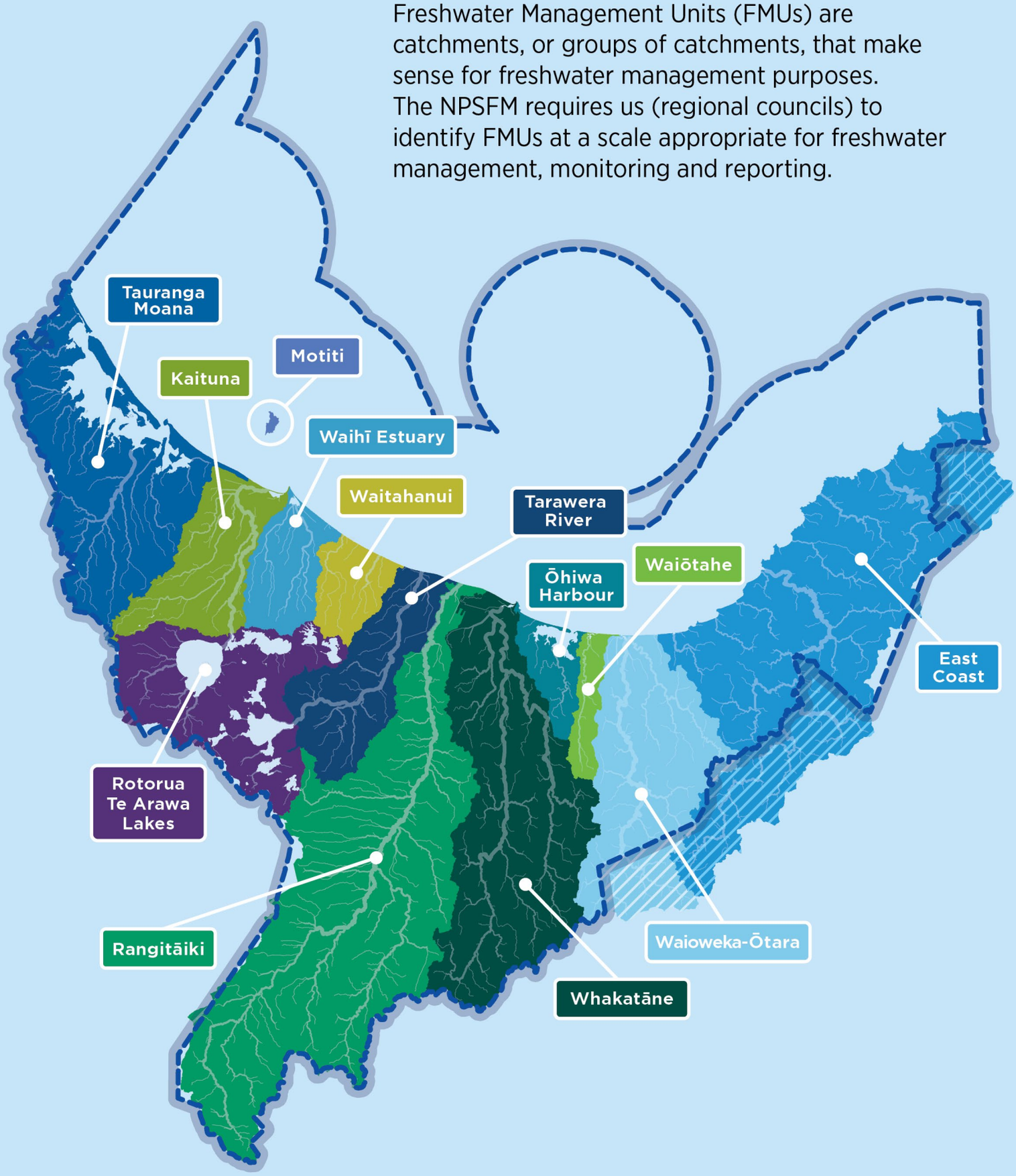
For more info

- Head to **boprc.govt.nz/freshwater**
- Read our Region Wide Overview booklet
- Sign up to receive our Freshwater Flash e-newsletter at **boprc.govt.nz/newsletters**
- Follow our social media
- Visit **participate.boprc.govt.nz**

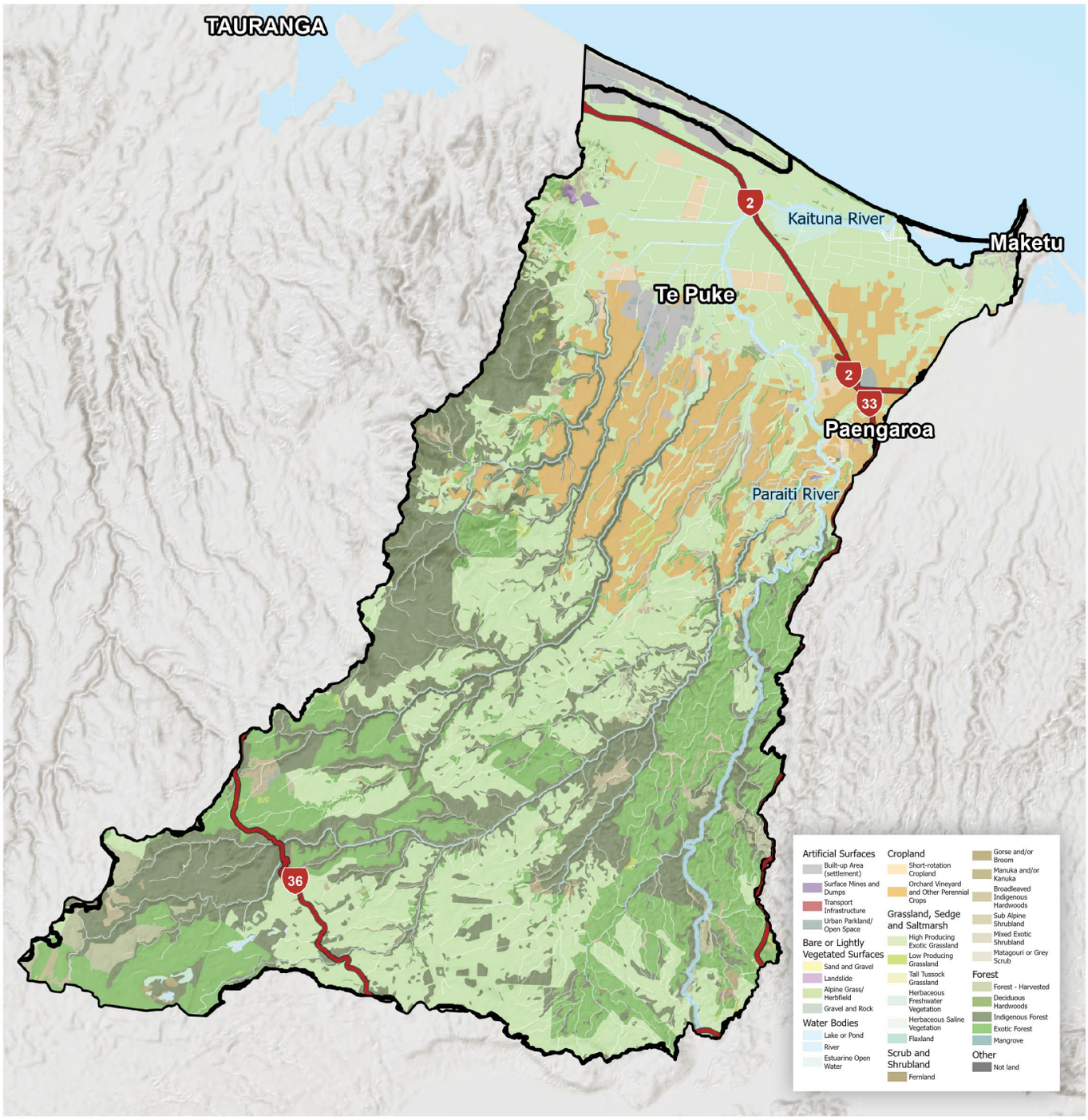
Ngā tauira o ngā rōpū whakahaere o te wai māori

Draft Freshwater Management Units

Freshwater Management Units (FMUs) are catchments, or groups of catchments, that make sense for freshwater management purposes. The NPSFM requires us (regional councils) to identify FMUs at a scale appropriate for freshwater management, monitoring and reporting.



We are proposing 13 Draft FMUs in our region, based on surface water catchments (or groups of these with similarities) and whether they feed into lakes, estuaries, or the ocean. Each Draft FMU has special characteristics (e.g., water body, cultural, community, geology, landform, land use and economic characteristics) that make it unique. Each will have its own chapter in the Regional Plan. The Regional Plan will have region wide rules but may also have rules specific to each FMU. The rules in FMUs may vary depending on the issues faced in that FMU.



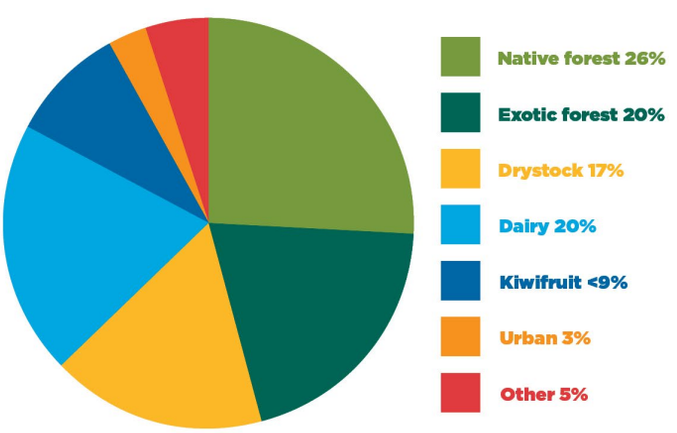
Kaituna - FMU Map

Land area:

60,000 ha

Population:

39,130 people



Mō te Tauira o te Whakahaere i ngā kāhui wai māori o Te Kaituna

About the Draft Kaituna Freshwater Management Unit (FMU)

The Draft Kaituna FMU follows the surface river water catchment boundary that feeds into Te Awa o Ngātoroirangi/Maketū Estuary or discharges at Te Tumu but excludes the upper half of the catchment where Lakes Rotorua and Rotoiti are (these are part of the Draft Rotorua Te Arawa Lakes FMU). The Kaituna FMU starts at Okere Falls and after flowing north for 50 km ends at Maketū, extending westward along the coast to Pāpāmoa East. The major tributaries feeding into the Kaituna River are the Mangorewa/Paraiti River, the Hururu, Pakipaki, Parawhenuamea, Waiari, Ohineangaanga, Raparapa-a-hoe, Kopuaroa and Waitepuia Streams.

The Kaituna FMU covers an area of approximately 60,000 hectares, which is about half of the 120,000 hectare catchment including the lakes. By the time the river reaches the sea, about half its water has come from lakes Rotorua and Rotoiti with the other half coming from springs and tributaries. The tidal influence on river levels is detectable as far upstream as the Pakipaki confluence at Waitangi, and the saline wedge can reach as far as the Tauranga Eastern Link bridge during spring high tides at low river flows.

Historically, the river discharged fully into Te Awa o Ngātoroirangi/Maketū Estuary, but it was diverted to sea at Te Tumu (Ford Road) in 1956 for drainage and flood protection purposes. Concerns about the ongoing degradation of the estuary due to the 1956 works led to 4% being re-directed in 1996. The Kaituna re-diversion project in 2020 re-directed about 20% of the river flows into the estuary to improve its ecological and cultural health.

Question 1 Do you think we have got this draft FMU boundary about right?

Tangata whenua

- This FMU covers the Kaituna River and all its tributaries within the co-governance area of Te Maru o Kaituna (Kaituna River Authority) identified in the Tapuika Claims Settlement Act 2014, plus the estuary and local catchments around Maketū township. The Kaituna River Authority produced a statutory document "*Kaituna He Taonga Tuku Iho - A Treasure Handed Down" 2018* (the Kaituna River Document) which contains a vision, objectives and desired outcomes for the Kaituna River developed under the co-governance framework. Iwi and hapū have also documented their individual values aspirations and concerns for freshwater and the estuary over time. The Maketū Estuary is fed by the river and was the landing site of the Te Arawa canoe.
- About 20% of the FMU land area, or about 12,000 ha, is Māori-owned land. Land use on Māori-owned land is dominated by exotic (45%) and native (22%) forest, followed by dairy (15%), sheep and beef (10%) and a range of other land uses (8%).
- Ngāti Pikiao, Tapuika, Waitaha, Ngāti Whakaue and Ngāti Rangiwewehi hold key interests from Okere to Maketū. Other iwi with areas of interest or heritage overlapping the FMU are Ngāti Makino, Ngāti Rangiteaorere, Ngāti Rangitihi, Ngāti Ranginui, Nga Potiki, Ngāi Te Rangi and Ngāti Pukenga and Ngāti Whakaue.
- Ngāti Rangiwewehi, the Affiliate Te Arawa Iwi/Hapū, Tapuika and Waitaha have statutory acknowledgements relating to water in this FMU. Council is committed to continuing the journey to involve tangata whenua in freshwater management and support Mātauranga Māori.

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Communities

- As of June 2022, the population of this FMU was estimated to be 39,130 people, concentrated on the coastal plain, mainly in Te Puke, Pāpāmoa East and Maketū. Urban growth in the Te Tumu area is estimated to add an additional 15,500 people once fully developed, and there is a private proposal for urban development around Paengaroa.
- Community feedback has told us that rivers and streams in this FMU are valued for kayaking, fishing, swimming, watercress harvesting, mahinga kai gathering, waterskiing, jetboating, white water rafting and waka ama. The Waiari Stream, Raparapahoe Falls, Whataroa Falls, Kaituna River, Mangorewa River, Ohaupara Stream, Onaia Stream have been identified as popular areas for recreation. The Maketū Estuary is also valued for swimming, bird watching and as a source of food.
- Freshwater features valued for their natural form and character include waterfalls (Waiari, Ōkere, Raparaparahoe), springs (Waiari Stream, Paraiti/Mangorewa River, Ohineanganga, Kaituna River and Taheke), wetlands (Te Pourepo o Kaituna/Lower Kaituna Wildlife Management Reserve, Te Pa Ika, Whakapoukorero/Arawa, Papahikahawai and Te Taumata) and the Mangorewa Gorge.

Land and land use

- This FMU is dominated by volcanic geology and porous ash or pumice soils everywhere except the lower flats which are made up of organic or gley soils. A thin strip of sandy soils exists along the coast.
- Land use within this FMU consists of 26% in native forest, 20% dairying, 20% exotic forestry, 17% drystock and over 9% or 5,500 ha of kiwifruit. Urban areas make up 3% of the catchment, although substantial expansion is planned.
- Pasture is the dominant land cover, but horticulture (mainly kiwifruit), is a notable feature of the lower catchment, and this is expanding into dairy and drystock areas that are well drained and lower than about 200m above sea level.
- A large part of the lower catchment was previously lowland wetland which has been drained for pastoral use. The Kaituna Catchment Control Scheme (operated by Bay of Plenty Regional Council through a targeted rate) includes a series of drains, canals and pump stations that drain the land and discharge into lowland rivers. Many of the former ox-bows in the lower river and tributaries were bypassed and straightened as part of the Scheme's work in the 1900s. The lower river and tributaries have stopbanks to protect surrounding land from a 1% Annual Exceedance Probability flood event, and substantial areas of rock armouring along the banks to reduce erosion. These changes have collectively had a large influence on water flow patterns and ecology of the catchment.
- This FMU contributes towards the Western Bay of Plenty District economic figures, where dairying and drystock farming are estimated to contribute $88 million and $28 million respectively to the Bay of Plenty's regional GDP in 2020/21. Kiwifruit growing and other horticulture are estimated to contribute $194 million and $27 million, respectively.

Rivers, streams, wetlands, and estuaries

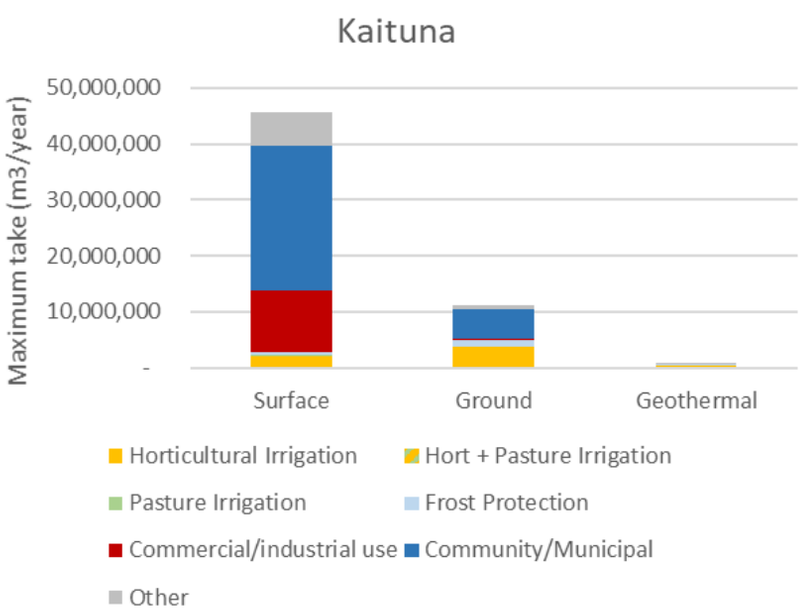
- Porous soils and permeable rock result in rapid infiltration of rainfall and relatively stable stream flows, strongly fed by groundwater. Baseflow is relatively insensitive to seasonal rainfall, but very sensitive to longer term trends.
- The Kaituna Catchment Control Scheme covers Lake Rotorua and Lake Rotoiti (which are not included in this draft FMU) and the Kaituna River. It includes stopbanks, flood gates, a mole structure at the river mouth and pump stations. Okere gates regulate flow from

Lake Rotoiti into the Kaituna River. The lowland part of the Kaituna River is highly modified and tidally influenced.

- Eighteen fish species have been recorded in this FMU, of which 14 are native. A wide variety of galaxids were found, including kōaro, banded kōkopu, giant kōkopu and the endangered shortjaw kōkopu. The Kaituna River is one of the very few homes in the region for threatened pīharau (lamprey).
- This FMU supports 25 threatened species and 25 areas with significant coastal biodiversity. Twelve priority biodiversity sites involve a water body within this FMU. There are 380 ha of wetland (6% of the historical extent).
- The Maketū Estuary is currently in a poor state due to eutrophication and sedimentation (elevated nutrient levels and mud), but is improving due to substantial increases in flushing brought about by the Kaituna River Re-diversion Project and associated coastal wetland restoration which have increased the tidal prism.
- It is often unsafe to gather shellfish from the estuary due to risks associated with faecal contamination.
- There are several key restoration projects within this FMU that are detailed in Te Maru o Kaituna River Authority's Action Plan "Te Tini a Tuna", such as the Kaituna re-diversion, Maketū Estuary enhancement and the Te Pourepo o Kaituna wetland creation projects, which have resulted in significant ecological improvements.

Water use, takes and discharges

- Water is used for a variety of purposes. It is used for a range of cultural purposes (such as karakia, iriiri, whakanoa), recreational purposes (such as fishing), mahinga kai, drinking/household supply and for food production (mostly horticultural irrigation/frost protection in the coastal area).
- As of January 2022, there were 187 water take consents in this FMU (51 surface water, 127 groundwater and nine "warm" geothermal). The majority of these are for horticultural irrigation and frost protection. However, most of the consented volume is for community and municipal supply, including one to take surface water from the Waiari Stream for the municipal supply of Tauranga City and Western Bay of Plenty District, and a number of smaller takes. A significant commercial take is for the AFFCO meat processing plant in Rangiuru.



Kaituna FMU Resource Consents to take water – volume m^3/year

- There are two substantial point source discharges in this FMU, one into the Kaituna River for the AFFCO meat processing plant and the other into the Waiari Stream for Te Puke treated wastewater. There are also 59 land discharge consents, 28 On-Site Effluent Treatment discharge consents and 36 discharge to water consents in this FMU.

What is likely to happen with climate change over the medium to long term (mid-late century)?

- Climate change projections are that land uses in the lowlands may be inundated by the sea, affected by saline groundwater intrusion, or by higher river levels, and may become less viable or unviable by the mid–late century. This needs to be considered when establishing management options for water quality and ecosystem health.
- Sediment loss from erosion is predicted to get a lot worse.
- Average annual rainfall totals are not expected to change significantly in the period to 2040, although the pattern changes, with less in the spring/summer months. In spring fed catchments such as the Kaituna, changes to low flow are likely to be subdued, although increases in evaporation and transpiration may result in increased demand. There may be higher flood flows in summer and winter.

Question 2 Does this brief summary about the people, land and water in this FMU seem right to you?

He aha tōu kitenga mō te anamata o te wai māori?

What is your vision for the future of freshwater?

Draft long-term vision for freshwater

A key part of freshwater planning is being clear about what you seek to achieve. A long-term vision for freshwater is required by the NPSFM and must set out what tangata whenua and the community collectively want to see for freshwater in the FMU. Visions should be ambitious but reasonable.

We've drafted some options based on issues and what we've heard from tangata whenua and communities so far. The vision options for the Kaituna FMU will not affect the objectives proposed in Change 5 (Kaituna River) to the Regional Policy Statement (RPS) but may refer to them once they have been incorporated into the Treaty Co-governance section of the RPS.

Option A The Kaituna River is in a healthy state and protected for the use and enjoyment of current and future generations and the ecosystem health and values of Te Awa o Ngātoroirangi/Maketū Estuary will be improved.

1. Innovative and sustainable land and water management practices support food production, food processing and flood mitigation so that waterways are safe for human contact, mahinga kai thrives and the ecosystem health is enhanced.
2. Sufficient water will be available for community and municipal supply to local towns, settlements and growth areas including Te Puke, Maketū, Paengaroa, Pukehina, Pāpāmoa and Te Tumu.
3. Pasture affected by climate change salinity impacts will be reverted to a sustainable landuse such as saltmarsh.

This vision is to be achieved by 2040.

Option B The Kaituna River is in a healthy state and protected for the use and enjoyment of current and future generations. The Kaituna River will contribute freshwater to Te Awa o Ngātoroirangi/Maketū Estuary which improves the health and well-being of the estuary.The Kaituna FMU will:

1. Support thriving mahinga kai, which is abundant, accessible and safe to eat for the local community and their manuhiri (particularly tuna (eel), inanga (whitebait), kōura (crayfish) and kuku (mussels)).
2. Support water quality, which is safe for swimming, recreation and mahinga kai gathering.
3. Support resilient, healthy and diverse aquatic life.
4. Protect and restore wetlands and riparian margins.
5. Protect wai tapu (places of significance to iwi) and the mauri of sites traditionally used for cultural ceremonies.
6. Protect and restore habitats of threatened species and these species begin to recover.

7 Efficiently provide drinking water for local towns, settlements and sub-regional growth areas (Te Puke, Maketū, Paengaroa & Pukehina and Pāpāmoa & Te Tumu growth areas).

8 In the lower Kaituna, preserve and where compromised restore natural form and character of the awa, including margins, wetlands and fauna.

9 The Kaituna FMU will contribute freshwater to Te Awa o Ngātoroirangi/Maketū Estuary:

(a) Reducing sediment accumulation in the estuary over time (compared to 2014 levels), in turn contributing sufficient water depth, flow and quality, maintaining navigable channels.

(b) Restoring ecosystem health, including indigenous birds, vegetation and fish habitat, and their food sources in Te Awa o Ngātoroirangi/Maketū Estuary.

Question 3 As a draft vision do you prefer Option A or B?

Draft values and environmental outcomes

The NPSFM uses the term "values" to refer to important aspects of freshwater. We must manage freshwater to protect compulsory freshwater values and must also consider other values if present. We must set environmental outcomes for these values.

We have used tangata whenua and community feedback as well as our own research to identify the values we think matter most in this draft FMU, including Maketū Estuary. We have heard that people want to be able to swim and gather kai without getting sick and want to know that the water supports a range of fish and other native animals. We have also heard that looking after streams and wetlands enhances their mauri.

Water is also valued as a resource for people and communities to use – at marae and in households, as drinking water for animals, for irrigation and food production, and for some commercial and industrial uses. Water is important for the livelihoods of local people, but we must make sure its use does not damage ecological health or diminish mauri.

The following table contains some draft outcome statements, based on what we have heard so far.

Freshwater Values *The ways fresh water is important* *Shaded values are compulsory national values in the NPSFM*	**DRAFT Environmental outcome** *How we would like the values to be*
Ecosystem health	The water quality and the mauri of the water is maintained and continues to provide for ecosystem health in the Hururu Stream and Paraiti/Mangorewa River, and the upper reaches of the Waiari and Raparapa-a-hoe Streams and Kaituna River. Water quality and ecosystem health is improved in the lower Kaituna River and tributaries. Water levels and flows are sufficient to retain adequate spring flow and prevent saltwater intrusion at the coast. Create, increase and enhance the extent and quality of wetlands in the lower Kaituna Catchment. Thriving indigenous flora and fauna, native plants, kōura (crayfish), tuna (eels), fish, inanga (whitebait), kuku (mussels) and other shellfish, watercress, trout and waterfowl. Manage

Freshwater Values *The ways fresh water is important* *Shaded values are compulsory national values in the NPSFM*	**DRAFT Environmental outcome** *How we would like the values to be*
	our taiao as a network of interconnected ecosystems taking a ki uta ki tai approach.
Human contact	Water quality is maintained or improved to be suitable for swimming and gathering kai with low risk of getting sick. Access and flows are sufficient and reliable for whitewater kayaking, rafting, sledging and canoe slalom in nationally recognised spots along the Kaituna, Mangorewa and Waiari.
Threatened species	Protect critical habitat to support the presence, abundance, survival, and recovery of threatened species.
Mahinga kai	Water is suitable to sustain plentiful kai awa (food sourced from the river, e.g., watercress, eels, and fish)) and kai moana (food sourced from the sea, e.g., shellfish and fish) within the Te Awa o Ngātoroirangi/Maketū Estuary which is safe to eat. Restore, maintain, and protect the mauri of freshwater resources to support the continuation of mahinga kai practices and associated tikanga.
Natural form and character	Protect the natural form and character of rivers, streams and wetlands, and improve the naturalness in areas with drains, channels, rock walls and stop banks, where opportunities arise.
Drinking water supply	People have sufficient, reliable, and safe water for drinking and reasonable domestic use, to the extent possible and subject to providing for the outcomes shaded above.
Wai tapu	Tangata whenua have access to sites of cultural significance
Transport and tauranga waka	Appropriate sites along the Kaituna River are set aside for tauranga waka (traditional waka landing places) and maintained.
Fishing	The Kaituna River continues to provide excellent fishing for rainbow and brown trout in the upper reaches close to Lake Rotorua, and continues to provide for an important local fishery, particularly in the proximity of the Paraiti River, Pakipaki and Waiari Stream mouths and the Kaituna cut. Ensure this river and these streams which flow into the lower Kaituna continue to provide a cold-water refuge for trout during summer.
Animal drinking water	Farmed animals have sufficient, reliable, safe, and palatable drinking water, to the extent possible and subject to providing for the outcomes shaded above.
Irrigation, cultivation, and production of food and beverages	Reasonable and efficient irrigation and food processing freshwater needs are provided for with an adequate level of reliability, to the extent possible and subject to providing for the outcomes

Freshwater Values *The ways fresh water is important* *Shaded values are compulsory national values in the NPSFM*	**DRAFT Environmental outcome** *How we would like the values to be*
	shaded above.
Commercial and industrial use	Reasonable and efficient commercial and industrial freshwater needs are provided for with an adequate level of reliability, to the extent possible and subject to providing for the outcomes shaded above.
Geothermal warm water	Significant geothermal warm water resources are protected from the cooling effects of activities and made available for efficient uses that require heat or heated water.

Question 4 What do you think of the draft values and outcomes identified for this FMU?

Te kounga o te wai me te oranga o te pūnahi hauropi

Water quality and ecosystem health

The vision, values and outcomes give a sense of where we want to be. How hard it is to get there depends very much on where we are right now. The things we do on the land can affect river, stream, wetland, and estuary health. We measure lots of different things to check the health of the environment- these are called attributes. The state given below is what it was like in September 2017 – called baseline state as defined in the NPSFM. The NPSFM has a grading system for each attribute. The grades are A-D bands. A band = very good state, D = poor state. The trend tells us whether it is getting better or worse over time.

Te Awa o Ngātoroirangi Maketū Estuary health

The main estuary attributes we measure are mud content, algae and seagrass cover, and sediment nutrients – like nitrogen and phosphorus. Like the NPSFM, the New Zealand Estuary Trophic Index (ETI) has a grading system that uses the same A-D bands.

Maketū Estuary ecosystem health is in a poor state – in the C band. Nutrients (nitrogen and phosphorus) have caused large algae blooms and there is a lot of soft mud in the estuary. Seagrass in the estuary has nearly disappeared. Sediment, phosphorus and nitrogen loads from the catchment are the key cause of this as well as historical changes in river flows through the estuary from the Kaituna River diversion.

There are several restoration projects within Maketū Estuary, the most notable being the Kaituna River re-diversion and wetland restoration. The re-diversion has resulted in significant ecological improvements in the estuary since its completion in 2020, with reductions in algae cover (decreasing to below 10%) and increases in shellfish density in the upper region of the estuary.

River and stream water quality for ecosystem health

The main water quality attributes we measure in rivers and streams are the contaminants of concern for most areas, the nutrients nitrogen and phosphorus, and sediment. Find out more about how we monitor river health, here.

The Council has three monitoring sites in this FMU to measure states and trends in river and stream water quality. In areas where we don't have enough monitoring data, river health has been estimated by an Expert Panel using the best information available. This gives us a sense of states and helps us identify where changes may be needed to meet environmental outcomes. The NPSFM requires us to take action and make improvements if water quality is below a national bottom line or is degrading (shows a worsening trend over time), unless this is due to natural causes.

Measured nitrogen concentrations are well below levels that can have toxic effects, in the A band, and are showing improving trends. Some of this change is likely to be related to improvements in the AFFCO meat processing plant discharge. However, nitrogen concentrations are high enough to affect ecosystem health in the estuary.

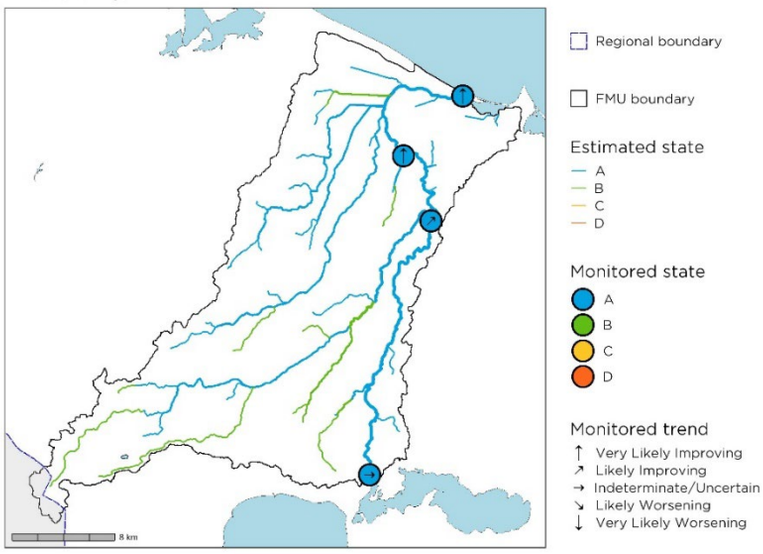
Measured dissolved reactive phosphorus concentration are high, in D band, but are showing some improving trends. The high phosphorus is likely from the volcanic influence in the area, although human activity will be adding to this.

Measured suspended fine sediment is elevated, and at two sites does not meet national bottom lines. At these levels, it is likely to be having moderate to high impacts on plants and animals in the lower Kaituna River. Also, large wet weather events can contribute harmful

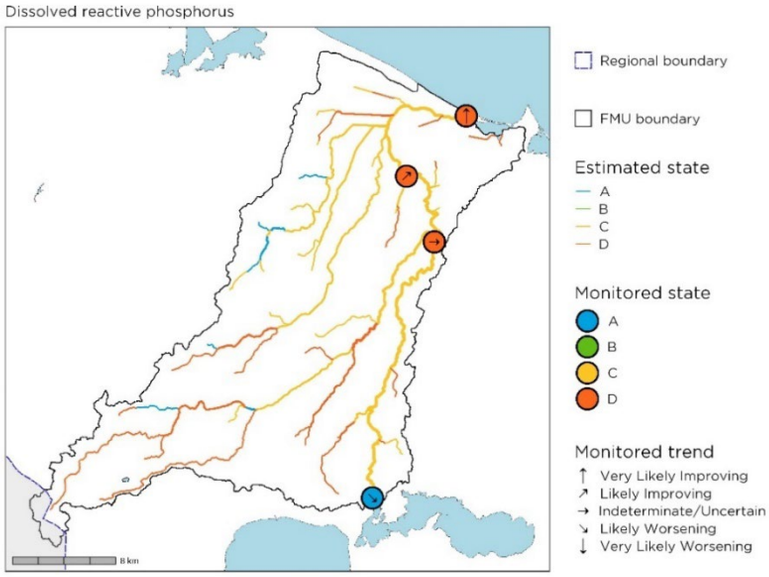
pulses of sediment that may not be reflected in this data. The good news is the trend is likely to be improving.

In addition to these monitored sites, some surveys of lowland drainage canals on the Kaituna Plains show quite poor water quality.

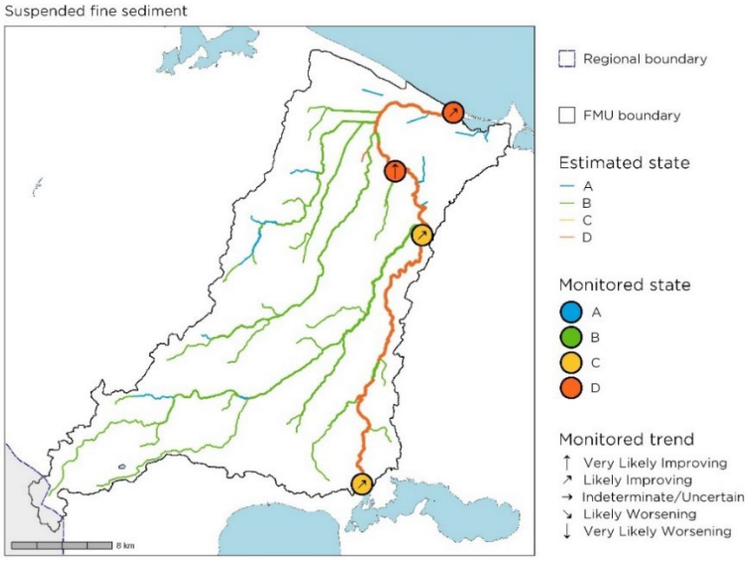
Nitrate (toxicity)



Dissolved reactive phosphorus



Suspended fine sediment



River and stream aquatic life for ecosystem health

The main aquatic life attributes we measure are fish, macroinvertebrates which include worms, snails, and insects, both in their immature larval phase, and as adults (e.g., mayflies, caddisflies, beetles), and periphyton - algae and fungi that grow on the beds of our rivers, lakes and streams and can make it slippery and slimy. For ease of interpretation, invertebrate data is simplified as special indices such as the Macroinvertebrate Community Index (MCI). The Macroinvertebrate Community Index (MCI) is based on the tolerance or sensitivity of species to organic pollution and nutrient enrichment and measures the presence (or absence) of invertebrates. Higher MCI scores indicate better stream conditions at the monitoring site. Two other indices are also used to describe macroinvertebrate health – the quantitative MCI and Average Score Per Metric; check out our Water Ecology Tool at www.boprc.govt.nz/wet for more information.

Fish surveys show 18 fish species recorded in this FMU, 14 of these are native. Longfin and shortfin eels, common and redfin bullies, smelt and inanga were the most common. A wide variety of other galaxids are found, including kōaro, banded kōkopu, giant kōkopu and shortjaw kōkopu, the latter which is endangered. Rainbow trout are relatively common, and other introduced fish include brown trout, mosquito fish and goldfish. Many of the fish species present are migratory, meaning any barriers could have a large effect on fish. This is particularly relevant in the lower parts of the FMU where pump stations and floodgates are present.

The Council has six macroinvertebrate monitoring sites in Kaituna FMU to measure state and trends in river health. A wide range of MCI state bands have been observed – A-D bands. Forested areas were generally better than pasture, and lowland drains were the worst. The low ecological condition in lowland drains reflects the lack of habitat features such as rough stream beds and banks, meandering channels, and overhead vegetation.

Whilst not toxic in Kaituna FMU, nutrients like nitrogen and phosphorous can promote plant, weed and algal growth and are contributing to the poor health in Maketū Estuary. Plant, weed and algal growth in rivers and streams in Kaituna FMU with mobile pumice beds is generally not an issue, but it can be a problem in some lowland drains and in the estuary.

Human contact

The main human health attributes we measure are faecal indicator bacteria and cyanobacteria (blue/green algae). Elevated levels of faecal indicator bacteria from animal dung, human wastewater and birds can make water unsafe for people to swim in or gather kai from. This is often used as a measure of 'swimmability'. *E. coli* is the bacteria we measure in rivers and lakes as an indicator of other bacteria that could be present. Faecal coliforms and *enteorococci* are the bacteria we measure in estuaries and the sea. Cyanobacteria, also known as blue/green algae, are a group of bacteria that can pose a risk to human and animal health due to the potentially toxic blooms. Find out more about how we monitor river health, here.

The Council monitors three recreational bathing sites located in the lower catchment on the Kaituna River and Waiari Stream, and at Maketū Surf Club. These sites are generally safe for swimming – A or B bands but have occasional increases in bacteria after rainfall. This means most of the time over summer there is only a very small risk of getting sick but there is higher risk of getting sick if you swim or wade in the areas after rainfall. Localised *enterococci* hot spots in the estuary occur around drain inflows.

The Council has one water quality monitoring site for shellfish harvesting at the Maketū Surf Club. Monitoring shows that water quality has not been safe for shellfish gathering/mahinga kai in the estuary for part of every season for the past five years.

In the Kaituna River, cyanobacteria come from the lakes upstream. Cyanobacteria at the lake outlet/start of the Kaituna have in recent times been suitable for contact recreation, however, past cyanobacteria blooms in the lake have resulted in health warnings raising cyanobacteria concentrations along the Kaituna.

Mahinga kai

The mahinga kai compulsory value includes the freshwater-related plants and animals that people can eat, the places these are harvested from and the tikanga (practices) of collecting or harvesting them. It is important because the loss of these species can have a profound effect on the communities who rely on them.

The lower Kaituna River wetlands around the Maketū Estuary are sites of historical and cultural significance and are a prized food source for tangata whenua. Mahinga kai species identified in this FMU include watercress, inanga (whitebait), kōura, kuku (mussel), pipi, tuangi (cockles), tuna (eels), mullet, kahawai and snapper.

We know there are other important traditional harvest sites and species in this FMU, but don't have much information about how tangata whenua would assess their state yet. We welcome any information tangata whenua wish to provide.

Where do contaminants come from?

This FMU is predominantly rural, and this is the main contributor of contaminants caused by human activities. The Rotorua and Rotoiti lakes contribute only 18% of the total nitrogen and total phosphorus load to the Kaituna FMU and only 12% of the total suspended solids load. The majority of the load for these contaminants comes from downstream of the lakes.

All land uses contribute nitrogen, phosphorus, suspended sediment and *E. coli*, and some level of these is natural. Dairy farming is estimated to contribute disproportionately more nitrogen, phosphorous, and *E. coli* load Drystock farming, exotic forest, kiwifruit and orchards and native forest all contribute to sediment and phosphorus losses. Point source discharges, particularly AFFCO and Te Puke Wastewater Treatment Plant are estimated to contribute a significant proportion of phosphorus and some nitrogen load.

Within each landuse, there is a wide range of practice on each property. For example, some kiwifruit growing and other intensive horticultural activities can have high nitrogen losses and contaminant runoff. There are some areas of land naturally have a higher risk of losses. For example, steeper land with higher rainfall often has higher risk of sediment and *E.coli* runoff over land. Wet areas, overland flow paths, porous soils, and pumped drainage areas pose greater risks that contaminants will enter rivers, streams, wetlands, groundwater and/or the estuary.

Freshwater health issues for this FMU

Te Awa o Ngātoroirangi Maketū Estuary has significant ecosystem, cultural and recreational values, which are degraded by sediment, nutrient and faecal contaminants. This is the result of historical modification and drainage in the catchment, including encroachment into the estuarine wetlands, the 1956 diversion of the Kaituna River at Te Tumu, wetland drainage and drain discharges, stopbanking, channelisation and straightening. It is also due to ongoing nutrient, sediment and bacterial loads from the catchment, and increased land use intensity over the past 35 years (eg higher stocking rates, fertiliser and other inputs). Dairy farming is a substantial contributor. Horticulture, drystock and to some extent forestry also contribute. Recent restoration and re-diversion activities have reduced macroalgae cover dramatically. However, degradation in the estuary is still clearly apparent, with high mud content, loss of seagrass beds and water quality which haven't yet improved. Substantial contaminant load reduction is required to support estuary ecological health, cultural and other values.

Lowland freshwater bodies have degraded water quality, ecosystem health, cultural values and natural character. Some of the lower reaches have not been monitored over the long term, but short-term monitoring illustrates these issues. Habitat features that support ecological health are generally absent. Elevated nutrient and sediment levels are primarily from intensive pastoral and horticultural land uses and land drainage in the lower catchment. Note a diversity of fish species was still found.

Water quality is often not safe for shellfish gathering/kaimoana in the Maketū estuary. This is largely due to faecal contaminants from rural land uses, particularly in the lowland drained areas in the FMU.

Water quality is not always safe for swimming at monitored freshwater sites. There are some periods after heavy rainfall when bacterial inputs are very high, particularly from farming in parts of the FMU with high run-off risks.

Cultural indicators of health. We know there will be important cultural indicators that can provide a deeper understanding of wai ora, but don't have much information about these. We welcome any information tangata whenua wish to provide.

Question 5	Does this brief summary about water quality in this FMU seem about right to you?
Question 6	How satisfied are you with the water quality in this FMU?

What are we aiming for?

The NPSFM requires us to set targets for water quality that are at least as good as the baseline state of the rivers and better than the national bottom lines set in the NPSFM. These targets are the specific, measurable levels of water quality or ecosystem health, which will help us to achieve the environmental outcomes (on previous page).

Te Awa o Ngātoroirangi/Maketū Estuary outcomes will drive the need for substantial change within the catchment to bring down all four key contaminants: in the order of 70% for nitrogen load, 30%-40% for phosphorus, 40%-60% for *E. coli*, and up to 39% for sediment. These are very large reductions.

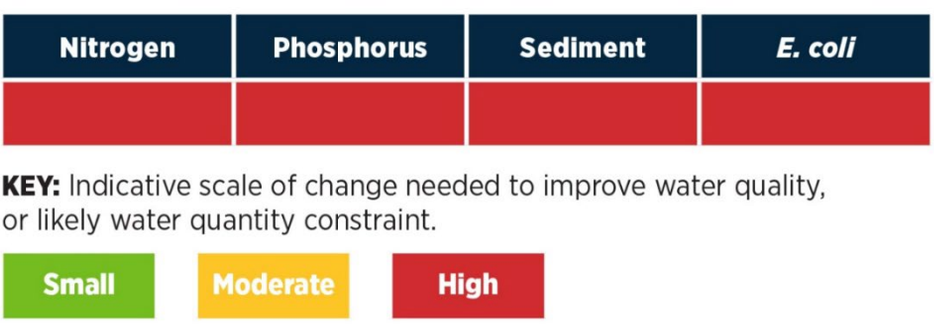
Some river water quality attributes are good (A band) and we need to maintain these. There are some sites where baseline state is worse than a national bottom line and we must act to improve this, unless it is due to naturally causes.This includes Suspended Fine Sediment at Te Matai and Te Tumu, and aquatic life attributes at Raparapahoe site at Te Puke Highway.

Several sites have water quality or ecosystem health attribute baseline states which are not 'A' band, but are better than a national bottom line. We can decide if we want to improve these or maintain them as they are. For any improvements, we also need to decide on a time frame in which they should happen.

From feedback we have received so far, we anticipate tangata whenua and communities will want:

- To achieve A or B band state for all attributes if this is achievable.
- To accept C band state or worse only if that is naturally occurring, or if climate change predictions suggest no better can be achieved.
- To apply a reasonable timeframe to achieve this, so that any land and water users who need to make changes have time to transition. For example, if the target is to keep current water quality, and the trend is not getting worse, the timeframe could be immediate or up to five years. However, the estuary needs large change, and targets for aquatic life attributes will also see a need to restore habitat and aquatic life in lowland rivers (including land drainage canals). More time will be needed to achieve this.

Indicative scale of nitrogen, phosphorus, sediment and *E. coli* load reduction needed to improve water quality and meet draft environmental outcomes.



How can we meet the outcomes and targets we set?

The outcomes we set for freshwater will be met via a mix of voluntary measures (things people choose to do themselves), investment and works/actions by Council, regulations the government has set that everyone must follow, and rules Bay of Plenty Regional Council sets in the Regional Plan. Regional Plan rules will be set if these are the most appropriate way to address remaining issues that are not likely to be addressed by national regulations.

Regional Councils must implement national regulations relating to freshwater (via consents, monitoring, and compliance). We cannot change these but can make additional rules if we think they are needed to address local issues. It is important to have a sense of what national regulations currently say:

National regulations for freshwater

Current national regulations require:

- Stock exclusion (with a 3 m buffer) from large rivers (>1 m wide), lakes and wetlands for dairy cattle on all terrain, and for drystock on low slope land (<5 degrees).
- Controls on activities within and close to rivers, streams, lakes and wetlands.
- Feedlots and stockholding area requirements: sealed; effluent collection, storage and disposal; 50 m setback from rivers, lakes, wetlands, bores, drains and the coastal marine area.

- Cap of 190 kg/ha/yr on the amount of synthetic N-Fertiliser applied to dairy farms, along with reporting requirements.
- Controls on intensive winter grazing on forage crops – subject to conditions or consent required.
- Consent required for substantial land use change from forestry to pasture, anything to dairy or dairy support, or extending the irrigated area within dairy farms (provisional rule expires 2025).
- Plantation Forestry: a number of practice requirements, including setbacks from rivers, lakes and wetlands, and requirements relating to earthworks, harvesting, slash and other activities.

Pending national regulations in 2023 are:

- Certified Freshwater Farm Plans will be required for all farms over 20 ha and horticultural enterprises over 5 ha. Farm operators will need to identify activities that pose a risk of contaminant loss and identify actions to reduce risks.
- New regulations requiring Regional Councils to control activities in drinking water source protection areas.

Draft water quality policy options

National regulations and region wide policy options to maintain water quality and ecosystem health will not be sufficient to achieve outcomes sought for this FMU.

The focus for this FMU is to restore lowland river and estuary ecosystem health, human contact and mahinga kai values. Options we are exploring for this FMU could include:

- Achieving a large reduction in Nitrogen, Phosphorus, Sediment and *E. coli* from the catchment over time. 40 years is suggested for the full reduction, with interim 10 yearly targets along the way.
- Using Freshwater Farm Plans to reduce risk, set minimum standards and continual improvement requirements to address rural land uses and practices that pose a high risk of sediment, nitrogen, *E. coli* and phosphorus loss, particularly in the lower catchments.
- Gathering farm data on stock, feed, fertiliser and other farm and horticulture nutrient inputs, and consider controlling these to bring down nutrient losses across the whole catchment, potentially with a cap on all nutrient inputs, and/or a sinking lid approach, stepped over time.
- Controlling intensive grazing that removes vegetation cover (such as strip grazing), cultivation and potentially horticulture, requiring active management of Critical Source Areas (overland flow paths), in similar way to national Intensive Winter Grazing Regulations.
- Exploring and encouraging physical technological solutions such as treatment of drain water, treatment wetlands, and sediment control bunds in appropriate locations.
- Requiring no future net increases in *E. coli*, nitrogen, phosphorus, or sediment as a result of future land use and practice change (this may require offsetting).
- Requiring retirement of land affected by salinity on estuary margins now, and that likely to be affected within the next 10 years as sea level rises over time.
- Encouraging restoration of in-river and in-estuary habitat, as well as estuary and river margin habitat, including fish passage.
- Supporting and encouraging land use change to land uses with lower contaminant losses, by providing incentives and removing barriers for land use change where we can. Indicate that land use rules will be revisited in 10 years.

- Controlling grazing of steep erosion prone land – either no stock, or stock size constraints.
- Continuing to reduce Phosphorus, *E. coli* and nitrogen from point source discharges via tighter conditions for resource consents, including requiring lined animal effluent storage and effluent irrigation rate, timing and volume requirements.
- Requiring stock exclusion from estuary margins and all permanent and intermittent rivers, streams, canals (which are modified rivers!) and drains. Maintenance of a thick grass sward on margins and/or planting of one side of drains and canals to provide shade and bring down water temperature.
- Restricting new irrigation, and managing all irrigation (particularly on pastoral land) as these tend to increase contaminant losses.
- Requiring temporary stock exclusion from ephemeral flow paths when wet.
- Requiring a raised dry pad for stock wintering on farm and raised or enclosed effluent storage in the lowland drained areas, to reduce contaminant runoff in rainfall.
- Requiring consents for pumped drainage discharges (including existing discharges), and apply a best practicable option approach to reduce contaminants and restore habitat and fish passage. Consider constraining periods of time that flap gates can be closed, treatment of drain water prior to discharge, reducing the area serviced, and/or good practice drain management requirements.
- Requiring plantation forestry management plans at the time of afforestation to address sediment loss during and after forest harvesting.
- Considering using the diversion gates during high rainfall and flow events to stop sediment laden flows from entering and settling in the Maketū estuary.
- Restoration of habitat along the main land drainage canals over time, which may require some retirement of land (e.g., to re-establish meanders, riparian habitat, whitebait spawning and refuge areas, wetland margins).

Question 7	Does our approach to setting the water quality targets seem about right to you?
Question 8	On balance, what is a reasonable timeframe to achieve these water quality targets for this FMU?
Question 9	Do you support the suite of draft water quality management options being considered for this FMU?
Question 10	What minimum good land management practice requirements do you think we should consider in this FMU?

Te nui o te waipapa me te tukunga

Surface water quantity and allocation

Surface water is the water that flows in rivers and streams, or in lakes. Across the region, water is taken for different uses, and is usually taken with a pump connected by pipe to the river or stream.

What are we aiming for?

How much water we take from rivers and streams for people to use will affect how much water is left for native fish and macroinvertebrates that depend on it for their survival, and for in-river cultural, recreation and other uses.

One of our main aims with water quantity is for people to know how much water is available to be used without causing in-river harm. We do that by managing water takes to ensure plenty of water remains to sustain habitats for the fish that live in the rivers and streams, and generally thereby protect other values too.

The NPSFM hierarchy of obligations prioritises the health and well-being of rivers, streams, lakes, wetlands, and groundwater first, then human health needs, and then ability of people to provide for social, cultural and economic wellbeing.

One of the ways we can do this is to protect native fish populations by setting limits on the total amount of water that can be allocated from each river or stream for people to use, and setting minimum flows, where users have to stop taking water if rivers and streams get too low. These limits can have a big influence of the health of rivers and streams, the things living in it, on the community, economic development and possible land use in the catchment. We also want to improve the efficiency of allocation by ensuring that people are not allocated more water than they might reasonably need or use.

How can we meet the outcomes we seek?

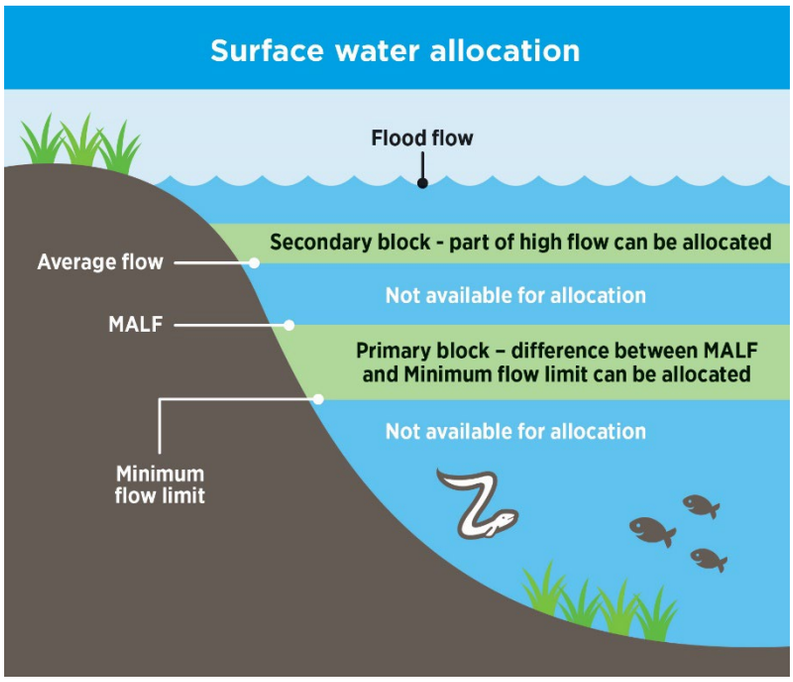
Our main tool for managing water quantity is the setting of minimum flows (limits to achieve the desired level of environmental protection).

Some rivers and streams are relatively resilient, and more water can be taken without affecting/damaging/stressing ecosystems, whereas others are more sensitive. Likewise, some fish prefer deep, fast flowing water and others prefer slower flowing, shallower rivers, and streams.

Currently a ‘one size fits all’ approach is used to set limits for surface water takes from most rivers and streams in the region. This approach has a default minimum flow of 90% of the 1 in 5-year low flow (the average of the lowest flow recorded in a rolling 5-year period) and an allocation limit set at 10%.

In five rivers and streams in this FMU, we now have river and stream specific scientific studies to help us understand the likely effects of different water levels on the different fish populations in each river and stream. We are using this information to draft new minimum flow limits for individual rivers and streams, based on achieving a consistent level of habitat protection for native fish (and sometimes trout).

For rivers and streams where such studies are not available, we’ve based the limits on our knowledge of river or stream characteristics and the results of other studies.



The above figure shows how the minimum flow limit, primary allocation block and secondary allocation block relate to the flow in a river or stream. Mean Annual Low Flow (MALF) is a commonly used measure that describes the average amount of water expected in a river or stream during times of low flow. It is calculated by averaging the lowest weekly flow in each year of the flow record.

If people are allocated (by resource consents) more water than the total allocation limit, rivers and streams are over allocated. The NPSFM requires us to not allow over allocation. While nobody wants to be told to stop taking water, especially during a drought, there is a trade-off between managing effects on the health of rivers and streams (constraining takes at the minimum flow), the amount of water available for people to use (allocation limits), and how often restrictions are needed (reliability).

Habitat retention levels

With a lot riding on the limits we set, we need to get them right. A key part of the consideration is what level of habitat protection we want i.e. At times of low flow, how much stress should organisms living in rivers and streams experience (they will be used to some stress from natural causes).

A proposed habitat retention level we are aiming to achieve by setting these minimum flows is shown in the table below. The suggested levels for target native fish species are based on our understanding of how flows affect these fish species, and how scarce and vulnerable or resilient the species are. For example, shortjaw kōkopu and giant kōkopu are threatened species that are scarce and vulnerable, so the highest retention level is proposed.

We know other considerations may be needed too, including ensuring flows support mahinga kai, cultural or recreational values. For example, where trout are in a river or stream, we suggest setting habitat retention levels for those to provide for fishing values, so these are in the table below as well.

We have also recognised that spring fed streams such as found in this FMU can be more resilient to the effects of taking water than other gravel bed type streams. We've identified an additional option for minimum flows of 70% MALF for these streams. This is consistent with the habitat retention levels for native fish, but may result in a slightly reduced level of protection for trout.

Target Species	Habitat retention level
Shortjaw kōkopu	100%
Giant kōkopu	100%
Other kōkopu species	95%
Kōaro (adult)	90%
Inanga	90%
Bullies (excluding bluegill)	90%
Eels (tuna) juvenile	80%
Eels (tuna) adult	75%
Torrentfish	70%
Bluegill bullies	70%
Trout	95%

Question 11 We are moving to limits on water takes based on habitat protection for fish. Does this seem the best approach?

Water use

Once we've identified the minimum flow to protect the habitat for selected fish, we need to decide how much water is available to allocate to users.

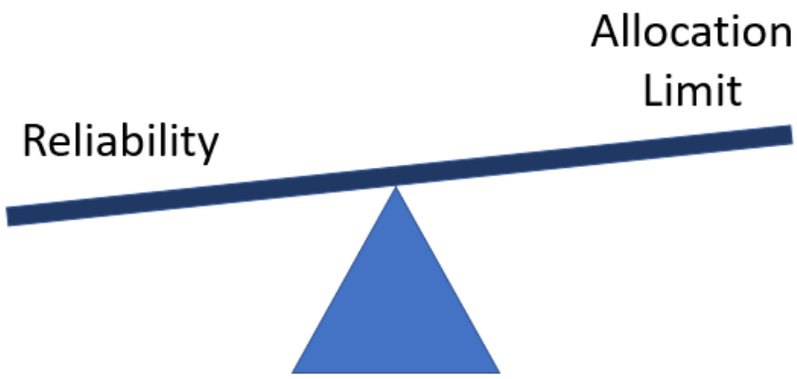
The current default allocation limit is currently set at 10% of the 1 in 5-year low flow. Based on the current default allocation limits, the Raparapahoe, Waiari, Ohineangaanga and Kopuaroa rivers and streams are currently considered over allocated in this FMU.

Reliability is a measure of how often authorised water users have to stop or reduce their water take (because rivers and stream are at, or would be below, the minimum flow). The higher the minimum flow, the more likely rivers and streams will fall to that flow due to natural conditions and the more frequently taking water will be restricted or stopped. The more water we allocate, the less reliable it is (the more often we need to restrict or stop water takes).

We've calculated the allocation limit by subtracting the minimum flow from MALF. This is called the primary allocation block and, depending on stream characteristics and the minimum flow, is usually quite reliable. On average, for spring fed streams in our region, a minimum flow of 90% MALF results in 14 days per year (and a range of up to 110 days) when no water is available to take. At a minimum flow of 80% MALF, the average days of no take reduce to two and range to 40 days.

If additional water was to be taken, this can be put into a secondary block which has a cease-take limit well above the river's mean annual low flow (MALF). This water would be available for many more users, but only when the river was running pretty high. Taking water in the secondary block would be ideal to fill off-river storage when natural river flows are high.

We do not need to do this, but if we do not, reliability may be worse, and everyone may need to stop takes more often.



A balancing act: With a set minimum flow limit, there is a trade-off between the amount of water allocated for use and the reliability of water availability.

Question 12 Do you support or oppose the idea of encouraging more users to store water after heavy rainfall to help us all get through periods of drought?

Question 13 If you had to choose between a reliable water supply but very little water available and more water available but unreliably, which would you prefer and why?

Question 14 Sometimes our surface water challenges are because people take water at the same time. How willing would you be to work with others in your area to ensure water is taken from your stream(s) at different times?

Question 15 When the minimum flow is set at a high level, there isn't much water available to allocate and reliability is likely to be poor. Would you support reviewing the habitat retention levels of fish in over allocated catchments to increase the amount of water available for allocation?

Surface water quantity issues

1 Some tributaries are over allocated when compared to limits to achieve the identified habitat retention levels (including trout).

2 Many users are allocated much more water than they have used, even in peak weeks of dry years. This can block other users from accessing water.

Question 16 Does this brief summary about water quantity in this FMU seem about right to you?

Surface water quantity options

In the past, we used a single allocation block (10% of the 1 in 5-year low flow) because we didn't have enough information to do better. Now that we have more information about our rivers, we can approach allocation differently. In some areas habitats will now need to be better protected, and in other areas more water will be available to use. We are now considering key options for setting allocation limits.

Option set 1: Choosing habitat retention levels

The first set of choices we need to make concerns the level of protection we give to the fish present in the river. This is discussed earlier in the paper. Essentially, we're keen to know if you support the idea of setting minimum flows based on the fish species present and if the level of protection is appropriate.

For spring fed streams we've also identified an alternative minimum flow that maintains the habitat retention levels for native fish but may result in slightly lower retention levels for trout.

Option set 2: Setting the primary allocation limit

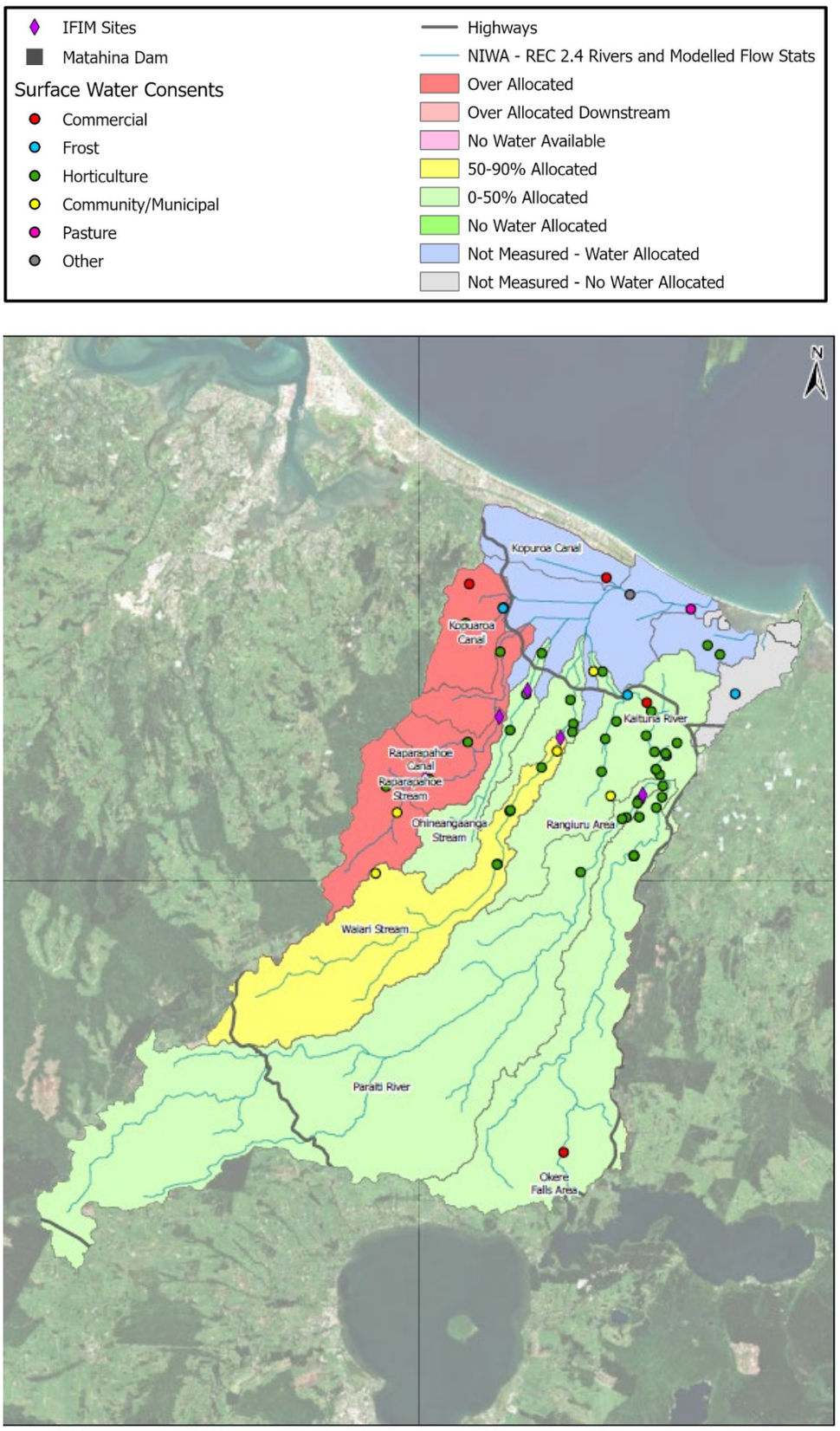
We've suggested that the allocation limit is calculated as the difference between MALF and the minimum flow to give a reasonable level of reliability and to look after the fish habitat. So, one option uses the minimum flow based on all target fish species present and their habitat retention level (called the ecological allocation limit in graphs below) and the alternative is based on native fish species present (called the alternative allocation limit in the graphs below).

Option set 3: Secondary allocation

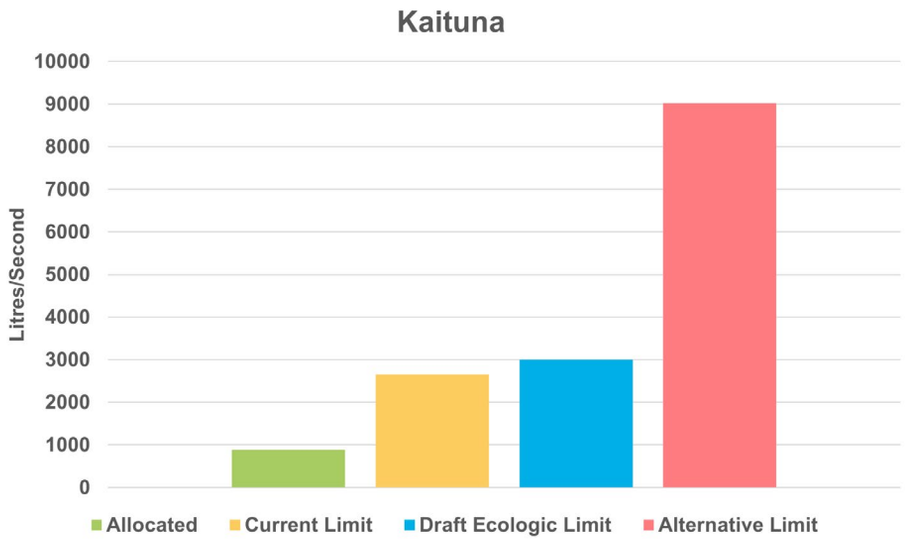
In addition to the primary block, we could allocate a lot more water and classify the extra water as unreliable in what we call a secondary block. This extra water would only be available to be taken during periods of high flow and stored in dams to provide reliable access to water during dry periods. We are still investigating where this might be suitable or how much extra water could be allocated.

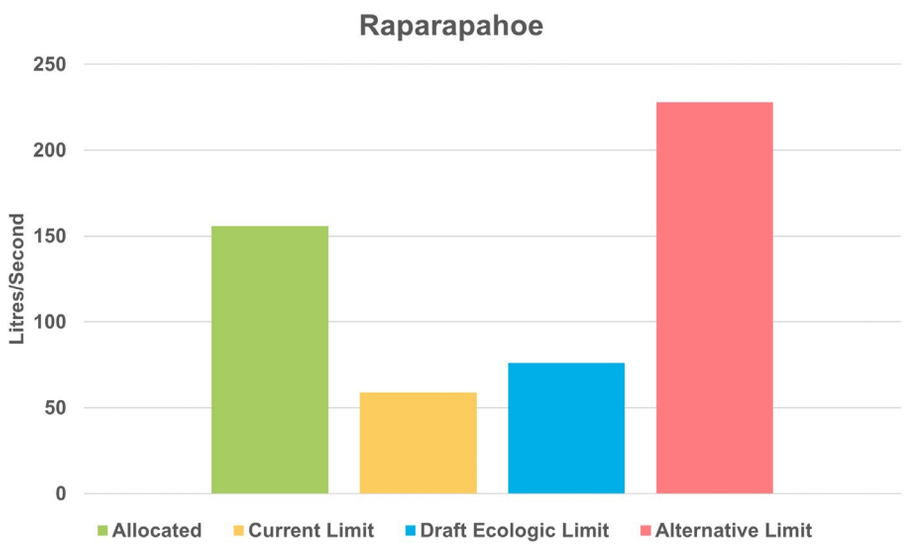
Question 17 We have options to set water allocation limits for a catchment that are complex and species and area specific or more generic, simple and region wide. Which approach to water allocation limits do you prefer and why?

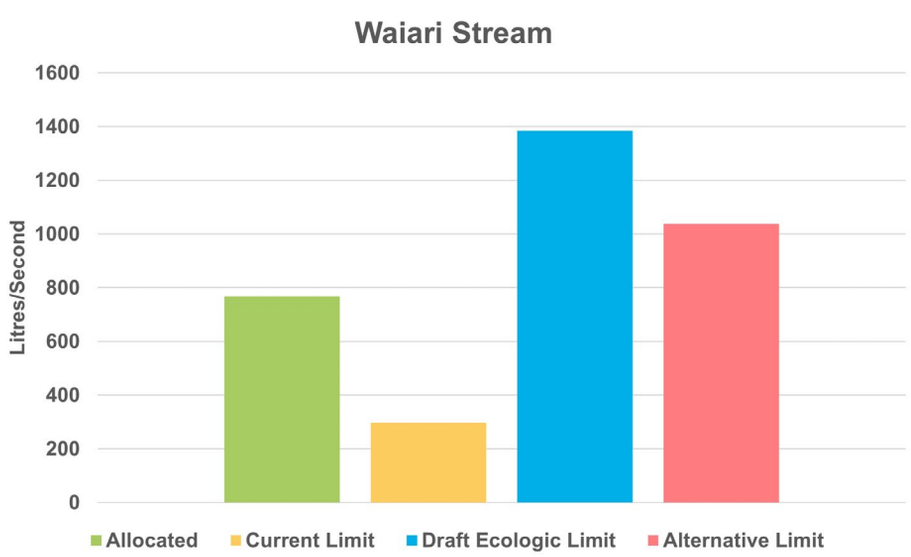
Question 18 A small number of catchments in the Tauranga Moana, Kaituna, Rangitāiki and East Coast FMU's are currently over allocated. We may need to claw back or reduce the overall water allocation in some catchments. How do you think we should approach this i.e. prioritise particular uses, timeframes for transition?



Allocation status based on draft minimum flows base on the habitat retention levels, and an allocation limit that is the difference between the MALF and the minimum flow. Under the alternative 'spring fed stream' limit (not shown on map) only the upper part of the Raparapahoe Stream remains over allocated.







Total water currently allocated to water users, current allocation limit (default allocable flow in the current Regional Plan, draft ecological allocation limit (total allocable flow using the difference between the Mean Annual Low Flow and the ecological minimum flow) and Alternative Allocation Limit for spring fed streams. (scale = litres per second)

Te nui o te wainuku me te tukunga

Groundwater quantity and allocation

Introduction

Groundwater is the water that flows underground – through gravels, sand, mud and between the crevices in rocks. Groundwater can be taken for irrigation or storage and can usually only be accessed via a bore drilled into the ground. In general, groundwater is more costly to access than surface water, especially if it is difficult to find or extract.

We manage groundwater differently to surface water. For groundwater, our focus is much more on the annual volume of water taken, while the surface water we are concerned about the rate of take at any one time. However, our concern for groundwater takes, also relates to how they will affect surface water features such as wetlands, rivers, and streams.

The Mamaku Formation ignimbrite covers most of the inland portion of the FMU. This is underlain by older ignimbrites (Rotoiti, Waiteariki and Aongatete Formations). Nearer the coast, the ignimbrite is covered by relatively young river and marine sediments.

There are multiple productive aquifers within this FMU.

The majority of bores on the coastal plain access groundwater from the younger sediments and there is a productive (water bearing) sand aquifer typically found at around 90 m-100 m depth. For inland parts of this FMU, bores typically target groundwater in the Waiteariki Formation ignimbrite, where it is exposed at the surface. Across the ignimbrite plateau, depth to groundwater can exceed 100 m due to the elevated terrain, high aquifer permeability and deeply incised water courses.

Streams and rivers draining the ignimbrite plateau are characterised by stable baseflow-dominated hydrology with minimal flood flows. This is indicative of the strong influence of groundwater discharge in these catchments.

Based on models, the quantity of groundwater allocated across this FMU is about what the FMU can sustain with little to no baseflow reduction on key streams at its modelled limit (1%). Allowing a reduction in baseflow in streams could make an additional 15,000 ML/yr (0.51 m^3/s) available for use.

Issues and options

Under the interim groundwater limits currently being applied (under the operative Regional Plan) groundwater management zones within this FMU are over allocated. However, this is likely due to the very conservative nature of the interim limits. Actual allocation demand is lower in comparison to demand density in neighbouring FMUs.

The Kaituna FMU is included within Bay of Plenty Regional Council's regional scale groundwater flow model for the Kaituna, Maketū and Pongakawa areas. This model will be used to inform the limit setting process by simulating various levels of hypothetical groundwater abstraction and evaluating the associated cumulative effects on river baseflows and groundwater levels.

Under the scenarios currently modelled, allocation is close to the conservatively modelled availability, with some opportunities for further take. This means that there may be opportunities to slightly increase supply in some areas. If water allocated by resource consents can be reduced to nearer actual take (typically users are allocated more water than they use in practice, so can reduce allocation with no impact) the resource should be able to sustain

further demand. Improvements in efficiency of use are typically achieved via the consent renewal process.

Provisions that encourage use of groundwater over surface water takes may also help reduce surface water allocation pressure; noting the relative resilience of base-flow dominated streams. There is surface water allocation available in the large rivers and as a result, there is little need to promote a transition from surface water takes to groundwater currently. However, conversion of existing surface water takes to groundwater remains an option as aquifer use results in reduced and delayed effects on surface water flows in larger rivers, despite the connectivity.

Next steps for this FMU will be developing new Groundwater Management Zones within which allocation limits are set. In this FMU this should result in a slightly simpler administrative arrangement with no significant impacts on existing users.

Question 19 Does this brief summary about groundwater quantity in this FMU seem about right to you?

Question 20 Groundwater is managed primarily to protect and maintain surface waters, and to meet current and future beneficial uses. What other things should it be managed for?

Question 21 Our understanding of groundwater availability is incomplete. We can set groundwater allocation limits that are lower i.e. more conservative or higher i.e. greater risk of overallocation. Where on the spectrum of risk are you?

For more information go to www.boprc.govt.nz/freshwater-info

Ngā mea e whai ake nei
Next steps

Feedback can be provided via our online platform, in person at community meetings, or in writing via post.

You can sign up to receive our Freshwater Flash e-newsletter at **boprc.govt.nz/newsletters** follow our social media or visit our website for regular updates.

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